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28 MONTHS LATER – EARLY STUDY ON  
PORTUGUESE REORGANIZATIONS

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### **Abstract**

The 2012 amendment to the Portuguese Insolvency Law aspired to recover viable firms by introducing a locally adapted Chapter 11, named *Processo Especial de Revitalização*, though collecting wide-spread criticism in the process. This paper studies the outcome of 339 reorganizations, dated from 2012 to 2013, highlighting a severe problem of filtering: 141 firms (41.6%) have already entered bankruptcy, have petitioned for a new reorganization or are inactive. Moreover, using the accounting information available and the Altman Model, neither reorganized companies appear to be fundamentally different from bankrupted firms, nor it was possible to winnow viable from non-viable firms.

**Keywords:** Bankruptcy Law; *Processo Especial de Revitalização*; Reorganization; Z-Score.

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*ANTONIO: Mark you this, Bassanio,  
The devil can cite Scripture for his purpose.  
(in The Merchant of Venice, Act I, Scene 3)*

## Introduction

Bankruptcy Law has implicitly regulated trade since credit as an institution gave its primal steps into existence. It is a pivotal economic matter, and the dialectical process of guaranteeing an efficient mechanism in managing default has been a permanent source of innovation in Law. From initial and primitive – and often barbaric – propositions laid by the Hammurabi Code or the Roman Twelve Tables to modern Western Law in its various forms<sup>1</sup>, Bankruptcy Law has shaped not merely the corporate environment but also consumer behaviour, while its arm's length was never limited to distressed agents, altering the conditions faced by healthy firms and solvent individuals<sup>2</sup>.

Furthermore, there is hardly a long-lasting design to be applied to Bankruptcy Law. Even if it is certainly true that, in historical terms, primacy has been given by Portuguese legislators to the institution of liquidation, recent pro-debtor considerations altered the nature of the Portuguese Insolvency Code (*Código da Insolvência e Recuperação de Empresas*, hereinafter referred to as *CIRE*). Specifically, following the Portuguese sovereign debt crisis and the consequent *Memorandum of Understanding* signed by the Portuguese Government, the International Monetary Fund (IMF), the European Commission and the European Central Bank, the need for new policies gained ground in regard to the corporate and household debt restructuring framework. Insolvency Law would need to be amended, “with technical assistance from the IMF”, in order to “better facilitate effective rescue of viable firms”, by – among other measures – “introducing fast track court approval procedures for restructuring plans<sup>3</sup>”. From such foundations, the 2012 amendment to the Portuguese Insolvency Law developed and a new hybrid procedure was introduced: a locally adapted Chapter 11, balancing

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<sup>1</sup> For a complete overview of the early history of Bankruptcy Law, I strongly advise the reader the works of Levinthal (1918) or Menezes Leitão (2012).

<sup>2</sup> And being even responsible for a source of inspiration outside Economics. Even the play from which the previously provided reference was taken (a reference for which a justification is due), has its main plot inspired by Bankruptcy Law.

<sup>3</sup> Portugal - Memorandum of Understanding on Specific Economic Policy Conditionality, 17th May 2011.

the influence of North-American Bankruptcy Law with the tradition of the German *Insolvenzordnung* or the Spanish *Ley Concursal*. A pre-bankruptcy measure, whose name was settled as *Processo Especial de Revitalização (PER)* and whose performance and adequacy is far from being a matter of consensus<sup>4</sup>.

Four years have passed since the previously mentioned amendment, *Lei n.º 16/2012* – in turn altered by the recent *Decreto-Lei n.º 26/2015*<sup>5</sup> – was enacted and data is now at a decent minimum to provide insight in terms of the policy's efficiency. Moreover, due to the importance of Bankruptcy Law in defining the economic development of a given region and the conditions faced by economic agents (either solvent or insolvent), efforts should now be directed towards the analysis of its effectiveness. Particularly, assuming that the legislator's task in facilitating the effective rescue of viable firms was successful, to what extent is the economic benefit of this legal mechanism being overpowered by the self-interest of non-viable firms' managers and shareholders? And could this mechanism be further reshaped in order to prevent the postponement of the liquidation of non-viable companies? As *Antonio's* prudence adverts, in Shakespeare's *The Merchant of Venice*, it is not seldom the case that positive and beneficial propositions are warped by wicked intentions. Or, as the legislator recognized regarding Insolvency Law, as far as 1899:

*...a astúcia dos interesses penetra e desconcerta as mais finas malhas da urdidura legislativa, e o dolo e a fraude, tantas vezes auxiliados pelo desleixo ou complacência dos próprios executores da lei, a breve trecho fazem do descrédito desta o pedestal dos seus triunfos.*<sup>6</sup>

The IMF itself recognized that, although the usefulness of the in-court restructuring procedure, *PER*, was generally acknowledged, “it has been sometimes utilized by insolvent companies that

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<sup>4</sup> Though not limited to those authors, criticism was immediately heard by Menezes Leitão (2012) or Serra (2013).

<sup>5</sup> Producing minor changes, whose scope covered merely, in regard to *CIRE*, the *quorum* required for acceptance of the reorganization plan (Article 17-F).

<sup>6</sup> *Preâmbulo ao Código das Falências 1899*, in Menezes Leitão (2012).

are seeking to delay traditional insolvency proceedings<sup>7</sup>”, while urging for severer post-reorganization oversight (a statement, which, while being valid, does not describe the full extent of the difficulties faced). Therefore, further critical inquiry should be made in how to winnow non-viable firms from accessing this legal instrument.

A literature review regarding the fundamentals of bankruptcy and reorganization, the effects of bankruptcy law over finance and the characteristics of *PER* is presented in Section I. A brief depiction of the evolution of bankruptcy prediction models is also presented in Section II, setting the ground in which the methodology used for this study (described in Section III) lays. In Section IV a description of the primary sample (reorganized companies) is given, as well as for the two secondary samples (composed of healthy firms and bankrupted companies). The obtained results are presented in Section V, with a general discussion of the topic. Finally, the study conclusion, summarizing the findings and its consequences, is developed in Section VI.

### **I. (a) The Fundamentals of Bankruptcy Law and Reorganization**

In the event that a given debt contract is breached, creditors will attempt to force the collection of their debts by seizing the debtor’s assets. In a summarized stance, Hart (2000) points two different methods of asset seizure at the disposal of creditors in western jurisdictions, if a formally-defined Bankruptcy Law is absent. The first method, only available for secured loans, considers that such creditors may seize immediately the asset standing as collateral for the debt. However, since this contractual solution was not defined ex-ante in the case of unsecured loans, the creditor may, through court, induce the sale of the debtor’s assets. Both methods are consequently based upon the *vigilantibus iura subveniunt* principle – those who are vigilant are assisted by the law (Menezes Leitão 2012).

Thus, the origins of Bankruptcy Law as a systematic set of rules is not primarily related with the protection of individual creditors, which could purely be enforced by the aforementioned

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<sup>7</sup> Portugal - Eleventh Review Under the Extended Arrangement, and Request for Extension of the Arrangement and Waivers of Applicability of End-March Performance Criteria (IMF 2014).

mechanisms, but relates with the legal remedies by which the collective interest of creditors is guaranteed (Hart 2000; Mucciarelli 2013), obeying to an equalitarian principle (*par conditio creditorum*). And the economic reasons upholding this concept are rather straightforward: even if, for the purpose of this paper, bankruptcy is categorized as a legalistic event, financially it may be described as the indefinite inability of the firm to comply with the previously arranged conditions of its debt contracts; thus, if a collective mechanism is unavailable, a race for the debtor's assets would inevitably arise, virtually denying any possibility of maintaining the firm as a going-concern (and, thereby, possibly reducing value for creditors).

Described as the *Creditor's Bargain* Theory, a compulsory law that coordinates debt-collection should provide creditors a reduction in strategic costs, an increase in the pool of assets and generate administrative efficiencies (Jackson 1982). Or, as Weijs (2012) asserts, such theory states that if creditors were asked how to handle a bankruptcy, in the absence of a bankruptcy law offering a collective procedure, they would suggest exactly that: a collective procedure. Asset stabilization, in terms of maintaining the value of a group of assets as a whole, as argued by Couwenberg and Lubben (2015), is located at the core of Bankruptcy Law and would not be safeguarded by contractual liberty alone. Also, von Thadden, Bergloef and Roland (2003) argued that though debt-collection plays a role, it should be complemented with a bankruptcy law that promotes ex-post efficiency (namely, regarding conflicts between creditors).

Therefore, neglecting the inefficient and time-consuming prescience of establishing, in the debt contract, how to handle a future bankruptcy as well as the Orwellian supervision of the debtor that should follow, state-provided Bankruptcy Law, in its various forms, appears to be the most efficient method to deal with this *common pool* problem<sup>8</sup>. Additionally, this line of thought may well explain why reorganization plans, such as the North-American *Chapter 11* or the

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<sup>8</sup> Nonetheless, it should be noted that while state intervention may protect the collective private interests of creditors, it may also derive wicked solutions. Such may be the case if soft bankruptcy laws are enacted, in such a way that, for example, the error of saving non-viable firms from liquidation surpasses the protection of viable ones.

Portuguese *Processo Especial de Revitalização*, should not be available to individuals<sup>9</sup>. Although economic thought supports that a firm's assets may be more valuable collectively than liquidated piecemeal, such reasoning is not as easily applicable to bankrupted individuals (especially non-entrepreneurs), who, independently from the outcome of the bankruptcy, cannot be separated from its faculties and, consequently, from their main source of value creation (Couwenberg and Lubben 2015). In fact, deeming such reasoning to be valid, this study focused merely on firms.

Regarding the bankruptcy process itself, the literature identifies two general categories of bankruptcy procedures: either an all-cash procedure or a structured-bargaining (Hart 2000). While the former provides a simple solution to a bankruptcy situation, by merely selling the assets under the supervision of a trustee, the latter requires creditors – the claimants – to decide the future of the firm and the collection of their claims. And, while the prevailing trend is to shift towards a structured bargaining (Brouwer 2006; Frouté 2007; The World Bank 2012), some difficulties yet remain to be addressed. Structured bargaining may originate sub-optimal solutions, for example, due to fixed voting rights (Hart 2000). Accordingly, it is possible that creditors that have nothing to lose (secured creditors, who may accept a non-viable plan or force a controlled liquidation<sup>10</sup> through a reorganization plan, often more time-efficient in the creditor's standpoint) or that have nothing to gain, except by delaying the bankruptcy (shareholders, who hold a call option on the firm's equity<sup>11</sup>), may control the reorganization process and expropriate value from unsecured creditors<sup>12</sup>.

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<sup>9</sup> Regarding the Portuguese Insolvency Law (specifically, in terms of reorganization), the scope of the measure is still debated. While Carvalho Fernandes and Labareda (2013) suggest that reorganization is only applicable to corporations and entrepreneurs, Casanova and Dinis (2014) advocate the extension of the policy to consumers (Epifânio 2015).

<sup>10</sup> Analyzing the North-American experiment, Baird and Rasmussen (2002) debated that reorganizations are either, when completed by giant corporations, intended, in the majority of cases, as a mechanism of “orderly liquidation” or are “increasingly irrelevant” if completed by smaller firms.

<sup>11</sup> As shown in *Figure 2* (Appendices).

<sup>12</sup> In fact, the same value-appropriation line of thought could be applied in the case of unsecured creditors (instead of shareholders), who may profit from delaying bankruptcy if the value of the firm is lower than the value of secured debt.



## **I. (b) Why Reorganization (and Bankruptcy Law) Matters**

Legal institutions – and in this particular case, Bankruptcy Law – play a significant role in economic prosperity. The inefficient must make way for the innovative and productive, freeing up resources, assets and liquidity to better uses – a corporate Darwinism, if such analogy is acceptable. Bankruptcy Law is the formal acceptance of this inevitable *creative destruction*. Therefore, a substantial amount of economic literature is devoted to analysing the effects of legal tradition and the structure of Bankruptcy Law on the overall economy.

Levine and Zervos (1998) empirically suggested that capital markets liquidity is correlated with economic prosperity. In addition, La Porta, Lopez-De-Silanes, Shleifer and Vishny (1997) compared the dimension of both equity and debt markets, using a sample of 49 countries, and found that the degree of investor protection offered positively affected the countries' capital markets. The means by which law influences finance were further described by the relationship between common-law systems and stronger investor laws (La Porta et al. 1998; Beck, Demirgüç-Kunt, and Levine 2003; Brouwer 2006). Such sequential correlation matches the thought of the political mechanism (Beck, Demirgüç-Kunt, and Levine 2003), stating that the protection of private investors – either shareholders or creditors – rights fosters financial development. An important balance is therefore widely addressed by the literature, in regard to the degree by which private property rights are favoured over State interests<sup>13</sup>. Further relevant factors, such as culture, are also cited to influence investors' rights, although to a lesser degree. For example, Stulz and Williamson (2003) found that, after controlling for the legal system

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<sup>13</sup> It is, however, fairly difficult to positively define what politically ought to be normative. Consequently, Bankruptcy Law is often subject to social welfare considerations, which may contradict efficiency ones, and the question whether such legal mechanism should accommodate socially-desirable ends is still debatable. In fact, several redistributive rules, though socially relevant, frequently arise from weaknesses of other social security institutions and may be inefficient (Mucciarelli 2013), in the sense that those “*social concerns may be addressed more readily by law other than the insolvency law, such as social welfare legislation, than by designing an insolvency law to achieve social objectives that are only indirectly related to questions of debt and insolvency*” (UNCITRAL 1993).

origin and GNP per capita, investor protection is still influenced by the religious tradition of the country.

Finally, another mechanism, the so-called “adaptability” mechanism (Beck, Demirgüç-Kunt, and Levine 2003), may also be responsible for the previously mentioned influence of law over finance. Under such school of thought, legal tradition defines the system’s ability to adapt to ever-changing circumstances, undermining or allowing the functioning of financial institutions. Though non-negligible scepticism is found in the literature (*ibid.*), the majority of authors agree that to a certain extent, legal tradition and institutions are responsible for financial and economic development.

While the Law and Finance Theory often emphasises the balance between private rights and state-interests, authors often draw further differences between countries by establishing a similarly straightforward distinction of pro-debtor or pro-creditor laws (Succurro 2010; Gutiérrez, Olmo, and Azofra 2012). And, although such categorization may be infrequently problematic, evidence suggests that the decision to favour one specific side defines the behaviour of the economy. Moreover, even if distinctions may often be straightforward, such decisions seldom are. As pointed by Berkovitch, Israel and Zender (1998), the discussion on Insolvency Law would be rather incomplete if both an efficient solution to corporate financial distress and an optimal set of investment incentives were not simultaneously proposed. Consequently, in a bankruptcy scenario, legislation must accommodate a shift of bargaining power to creditors, so that creditors’ claims are shielded from further damage, without restraining the ex-ante investment decision of the entrepreneur (Berkovitch, Israel, and Zender 1998; Succurro 2010). A delicate balancing is, therefore, required from the legislator.

Moreover, even if one single solution to this balance may be ruled out, in the sense that the optimal model may depend upon other country-specific factors (Hart 2000; Djankov et al. 2008), it is suggested that favouring an entrepreneurial and debtor-friendly environment may

lead to enhanced growth. While addressing specifically the impact of Insolvency Law in the outcome of financially distressed firms, Gutierrez et al. (2012) found that the value of corporations in financial distress diminishes if facing creditor-oriented legal systems. The authors further expanded the topic by suggesting that pro-creditors laws may cause losses of efficiency in distressed firms, due to a higher propensity to sub-optimal investment decisions, namely, by means of debt-overhang (underinvestment) or overinvestment. Additionally, a loss of efficiency should arise in bankrupted corporations, as a result of the increased probability of liquidating efficient firms, under systems favouring creditors. Frouté (2007) also proposed, using a theoretical framework, that pro-debtor law is in line with creditors' interests, thus improving efficiency. Such arguments, as a consequence, could be seen as an additional justification for the past changes of European countries' Bankruptcy Law towards debtor-friendly systems.

If such distinction had to be drawn, the 2012 amendment to *CIRE* would likely be described as debtor-oriented, by obeying the lines of the North-American Chapter 11 (Gonçalves 2013), the most prominent debtor-oriented legal mechanism (Gutiérrez, Olmo, and Azofra 2012). Considering the paradigmatic case of the Chapter 11 *vis-à-vis* Chapter 7, Bankruptcy Law was designed in the U.S. in such a way to allow viable firms to be restructured by the former, while guaranteeing that firms fated to fail are filter and liquidated by the latter (White 1994). Analogously, endeavours should be focussed on ensuring that ideally nonviable companies are unable to restructure under the Portuguese design. Or, using the nomenclature frequently found in the literature, this paper deals mainly with Type I error, i.e., nonviable firms that are saved by means of a restructuring plan<sup>14</sup> (ibid.). Although data is scarce regarding the Portuguese legal system results, comparisons may be drawn with the United States. Evidence suggests that such error is not infrequent, and may represent a substantial part of reorganizations. Hotchkiss

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<sup>14</sup> As opposed to Type II error, referring to viable firms that are liquidated.

(1995) found that, in a sample of 197 companies that were subject to a Chapter 11 reorganization plan, 32% re-entered bankruptcy or restructured their debt out of court. Alderson and Betker (1999) found that 24% of their sample required a second debt restructuring and an additional 3% were liquidated within five years of the initial reorganization. More recently, lower rates were found, but the recidivism rate still reached 18.25% (Altman and Branch 2015). Even if the acceptance of debtor-friendly laws is reaching a consensus, international data suggest that such system is far from being fully efficient.

Furthermore, the origin of such error and its subsistence are fairly intelligible. Frequently, restructuring and, thus, delaying formal bankruptcy, may be beneficial for the firm's shareholders and managers. While the former will enjoy the increase of the call option<sup>15</sup> that implicitly describes the value of equity (the so-called "delay and pray" and "pretend and extend" that expropriates value from creditors), the latter may, for example, extend their jobs' life expectancy (White 1994; Povel 1999). White (1994) further demonstrated that pooling between managers of both viable and nonviable companies may also benefit the former group: if filtering viable from non-viable corporations frequently fails, creditors may be willing to accept lower payments from viable firms, due to their inability to correctly categorize the debtor.

Finally, the existence of such incentives often leads to losses borne by other undistinguishable economic agents – i.e., not only creditors - due to spillover effects, so that viable firms and especially healthy firms may also be negatively influenced by a flawed law. Not only does Insolvency Law certainly define the ultimate economic value of a financially distressed firm (Gutiérrez, Olmo, and Azofra 2012), but it may also influence the conditions faced by the remaining companies, for example, by increasing the cost of debt (Rodano, Serrano-Velarde, and Tarantino 2013). Davydenko and Franks (2008) also argue that creditors adjust collateral

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<sup>15</sup> As shown in *Figure 2* (Appendices).

requirements in order to accommodate national differences in Bankruptcy Law. Nonetheless, the latter authors observed that such legal differences were still connected with national variability in terms of bankruptcy outcome, despite the creditors' adjustment.

### **I. (c) The “Portuguese Chapter 11”**

First introduced in 2012, *PER* was seen as opposed to the very nature of *CIRE* - the latter being mainly inspired by the German *Insolvenzordnung*, thus ending in 2004 the pro-debtor tendency of its predecessor, *CPEREF*<sup>16</sup> (Menezes Leitão 2012). In fact, while *CPEREF* set as the foundation of bankruptcy the maintenance of the firm as a going-concern, *CIRE* altered the nature of the law by giving primacy to creditors' rights. Those rights could either be guaranteed by the liquidation of the distressed firm or by its restructuring, and creditors were given absolute rule over such assessment.

A further change was however imposed by the 2012 amendment, introducing a pre-insolvency restructuring and thus partially tempering the incapacity of *CIRE* to deal with the Portuguese economic crisis. The mechanism is defined by Articles 17-A to 17-I, complemented by the remaining articles encompassed in *CIRE*, *mutatis mutandis*, and finally and analogously to the latter, by *Código de Processo Civil* (Epifânio 2015). Following the intent of reducing the court involvement in bankruptcies, it is also a hybrid proceeding (in fact, it may be viewed as a quasi out of court mechanism); however, it is still a judicial procedure, classified as urgent (Art 17-A, paragraph 3). Finally, it is a proceeding in which creditors compete for their claims and in which the final reorganization plan binds every creditor, even those who did not participate in the process or disagreed with the plan<sup>17</sup> (Art 17-F. paragraph 6).

Several characteristics are shared with the North-American Chapter 11, namely the institution of debtor-in-possession and automatic stay. Consequently, due to the former, the incumbent management remains in charge of the company, although a trustee-like figure is appointed

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<sup>16</sup> *Código dos Processos Especiais de Recuperação da Empresa e de Falência*.

<sup>17</sup> At least, as later discussed, creditors other than the State.

(*Administrador Judicial Provisório*), hence limiting the management decision-making freedom as defined by Art 17-E, paragraph 2 and subsequently Art 161 (*CIRE*). An automatic stay is also implemented, preventing collection of debt during the negotiation period and extinguishing any lawsuit, except if defined otherwise in the reorganization plan (Art 17-E, paragraph 1).

Using the index provided by Gutiérrez et al (2012), which compares the orientation of reorganization instruments in terms of debtor and creditors rights, it is possible to conclude that, similarly to the Spanish Law, the Portuguese proposition, *PER*, is fairly close to the pro-debtor system prevailing in the United States<sup>18</sup>. It should, nonetheless, be mentioned that some questions arise in regard to the score of certain variables. For example, while *PER* affects guaranteed creditors, there is low flexibility when negotiating with the State; in fact, any proposal outside the range defined by *Lei Geral Tributária*, should constitute a non-negligible violation of the Law and should result in the rejection of the plan by the court<sup>19</sup> (Gonçalves 2013; Menezes Leitão 2015). Furthermore, although the debtor-in-possession financing, described by Art 17-H, is conceptually similar to the North-American counterpart, it is limited in extent. While, in the North-American tradition, priority is always given to new capital – a quasi-violation of the absolute priority rule (Brouwer 2006) – Portuguese Law fails to provide an attractive seniority for fresh capital, ranking before guaranteed creditors and state claims (Gonçalves 2013; Menezes Leitão 2012; Epifânio 2015). In fact, according to Epifânio (2015), a more ambitious solution should be attempted, similarly to the Spanish, French and Italian counterparts, in which new capital is regarded as an insolvency claim.

## **II. Predicting Bankruptcy**

Although virtually non-existent before 1965, bankruptcy prediction models have developed exponentially, offering today a robust solution to an array of industries and agents, from credit

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<sup>18</sup> The index score for Portugal was computed using the same methodology found in Gutiérrez et al, and may be compared with the results found by the authors in *Table 4* (Appendices).

<sup>19</sup> Recently, a less harsh solution is often applied and the plan is accepted, though not affecting state-related entities.

risk and portfolio managers to academics and – conceivably – legislators<sup>20</sup>. From simple ratio analysis firstly performed in the 1930's; to the Univariate and subsequent Multivariate Discriminant Analysis (MDA) that reigned in the 1960's and 1970's; to the Logit and Probit Models of the 1980's and 1990's; and finally the Neural Networks that appeared at the end of the last century<sup>21</sup> (Bellovary, Giacomino, and Akers 2007), bankruptcy prediction has yet to fully materialize its usefulness to Bankruptcy Law's design.

Originally developed for taxonomic research (Fisher 1936), Discriminant Analysis has been successfully used in several financial studies and it could be stated that its popularity is mainly due to the work of Altman (1968), who coined the industry's well-known *Z-Score*. An honourable mention should also be made regarding the pioneer univariate study of ratio analysis developed by Beaver (1966). While certainly simplistic, evidence shows that, historically, it is the most accurate method, only matched by Neural Networks (Bellovary, Giacomino, and Akers 2007); also, its simplicity remains a fundamental advantage of the model, which may be virtually used by any individual, with no prior knowledge of statistical techniques. Moreover, the comprehensive study performed by the same authors also implies that modern models, independently from the technique used, may not be as efficient as the original MDA, nor more factors suggest a higher predictive capability. Altman (1968), using five predictors only, registered a 95% accuracy in predicting bankruptcy, one year prior to the event (increasing the timeframe to two and three years would yield an accuracy of 72% and 48%, respectively). Later studies from other authors using MDA also registered promising results<sup>22</sup>. Recently, in 2009, a variant of the *Z-Score* model was used to filter recurring bankruptcies (non-viable corporations)

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<sup>20</sup> It should be recognized that the *raison d'être* of this study and particularly the proposed methodology is hardly original. In fact, the nature of the problem addressed is considerably related with similar endeavours made by Altman. Hence, similarities are even shared in the motivation of the study, in the sense that there is also the belief “that a credible corporate distress predication model can (...) be used as an independent technique by the bankruptcy court to assess the future viability of the reorganization plan” (Altman, Kant, and Rattanuengyot 2009).

<sup>21</sup> And the yet more recent development of Support Vector Machines, allowing for non-linearity and non-monotonicity in the model (Härdle, Moro, and Schäfer 2005; Lacerda and Russ 2008).

<sup>22</sup> For example, the works of Deakin (1972), Marais (1979), or Frydman, Altman and Kao (1985).

from viable firms, observing that the former had a significantly worse financial profile than the latter (Altman, Kant, and Rattanuengyot 2009). Studies abroad were also attempted; for example, using a sample of British companies, bankruptcy was predicted five-years prior to the event with an accuracy over 80% (El Hennawy and Morris 1983). In Italy, an accuracy above 90% in the first year was achieved, with success rates not lower than 70% for the whole five-year period (Altman, Falini, and Danovi 2013).

Some disadvantages are nonetheless widely recognized. As pointed out by Ohlson (1980), one of the first to apply Logit models in bankruptcy prediction, the bankrupted and non-bankrupted groups do not share the same variance-covariance matrices, limiting its usefulness in the Econometrics field. Moreover, the requirement for normality regarding the models predictors is often disregarded – nonetheless, “deviations from the normality assumption, at least in economics and finance, appear more likely to be the rule rather than the exception<sup>23</sup>”. Even if it must be recognized that a substantial bias may be present in the econometric analysis of MDA (Eisenbeis 1977), the previously mentioned pitfalls may be considered negligible in face of the ultimate purpose of the model: to simply provide a discriminating instrument (Ohlson 1980).

In terms of Portuguese studies, discriminant analysis was, for example, used as a credit score model (Soares 2006). Lacerda and Moro (2008) also tested the predictors of default for Portuguese firms by using Logit, MDA and Support Vector Machines. Bonfim (2009) deepened the characterization of the determinants of default for Portuguese firms by simultaneously considering firm-specific data and macroeconomic variables, thus discussing the predictive power of idiosyncratic and systematic factors. Another noteworthy analysis of corporate creditworthiness, with similar objectives, was also performed by Antunes, Ribeiro and Antão (2005).

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<sup>23</sup> (Eisenbeis 1977)



Finally, scarce – partially justifiable, attending to the temporal dimension of the 2012 amendment – literature has been devoted to characterizing the effects of *PER*. *APAJ*, *Associação Portuguesa de Administradores Judiciais* – hardly an independent source of data – publishes data, in association with Turnwin, only on an intermittent basis. Simão (2015) provided insightful data and found that only 58% of the companies that filed for reorganization remain active. However, the sample used included companies whose plan was immediately rejected, either by creditors or by the court. In addition – and contrarily to the author’s conclusion – the “low level of success in negotiations” should not be viewed necessarily as a failure of the Law, since it may indicate an appropriate filtering of viable from non-viable companies. In fact, the most important figure should not be the percentage of firms whose plan fails to be approved, but the incidence of firms that fail to prosper after a plan is put in motion.

### **III. Methodology**

Combining a group of three major samples (restructured companies, bankrupted ones and healthy firms) a wide range of questions could be addressed. Namely, are restructured companies fundamentally different from bankrupted entities in terms of financial indicators? Additionally, could MDA be used to filter healthy companies from firms who file for reorganization in the following year? And, if such is the case, could the same methodology be applied to restructuring proceedings in order to filter between viable and non-viable firms, thus assisting court officials in analysing reorganization plans<sup>24</sup>?

Descriptive statistics were thus computed mainly inspired by the independent variables of the predictive model provided by Altman and Hotchkiss (2005) for private firms (the Z’’-Score).

Therefore, the chosen ratios may be written as:

$$X_1 = \frac{\text{Current Assets} - \text{Current Liabilities}}{\text{Total Assets}}$$

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<sup>24</sup> Similarly to the methodology used by the already mentioned work of Altman et al (2009).

$$X_2 = \frac{\text{Retained Earnings}}{\text{Total Assets}}$$

$$X_3 = \frac{\text{Earnings Before Interest and Taxes}}{\text{Total Assets}}$$

$$X_4 = \frac{\text{Book Value of Equity}}{\text{Total Liabilities}}$$

Moreover, the predictive capacity of MDA was used repeatedly in order to differentiate between healthy and distressed firms; bankrupted from reorganized companies; and using a sample of reorganized companies only, viable and non-viable firms. Though simplistic, such model was chosen hoping that – if successful – it could be massively used by court officials and lay parties, while avoiding the complexity and the prolixity of other econometric techniques.

Theoretically, MDA is a linear combination of a given set of variables,  $X_{j,i}$ , with the purpose of categorising each observation into one group. A score,  $Z_i$ , is therefore derived, as follows<sup>25</sup>:

$$Z_i = \sum_{j=1}^n \gamma_j X_{j,i} \quad (1)$$

in which  $\gamma_j$ , the discriminant coefficients, are calculated in order to maximize the distance between the mean of the analysed groups.

Furthermore, this mentioned objective is satisfied if, additionally, the following equation is also verified<sup>26</sup>:

$$\boldsymbol{\gamma} = \mathbf{C}^{-1}(\mathbf{X}_{\text{Group A}} - \mathbf{X}_{\text{Group B}}) \quad (2)$$

where  $\boldsymbol{\gamma}$  represents a vector containing the discriminant coefficients,  $\mathbf{C}$  the covariance matrix of the estimators and  $\mathbf{X}$  a vector composed of the predictors' means, per group.

Finally, the score obtained for each observation is then compared with a given cut-off point, under which the company is classified under Group B. Such cut-off point,  $\alpha$ , is usually defined

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<sup>25</sup> As elaborated by Resti and Sironi (2007).

<sup>26</sup> Applicable to a two group case.

as the mean between the two centroids<sup>27</sup> (also considering a two group scenario):

$$\alpha = 0.5 \mathbf{Y}'(\mathbf{X}_{\text{Group A}} + \mathbf{X}_{\text{Group B}}) \quad (3)$$

Or, alternatively, the results may be analysed using a probability of default,  $PD_i$ , given by:

$$PD_i = \frac{1}{1 - \frac{1 - \pi_{\text{Group B}}}{\pi_{\text{Group B}}} e^{Z_i - \alpha}} \quad (4)$$

where  $\pi_{\text{Group B}}$  denotes the prior probability of Group B, and  $Z_i$  and  $\alpha$  refer to the values derived in equations (2) and (3), respectively. Thus, though an analogous cut-off point of 50% is implied, we may define a stricter critical value, in order to diminish the incidence of Type I errors.

Regarding the case discussed here, the problem assumes a binary form with only two possible groups, either bankrupted or non-bankrupted companies (and viable or non-viable firms). Its final linear form is hence given by:

$$Z_i = \gamma_1 X_{1,i} + \gamma_2 X_{2,i} + \gamma_3 X_{3,i} + \gamma_4 X_{4,i} \quad (5)$$

where  $Z_i$  denotes the overall score,  $\gamma_j$  the discriminant coefficients and  $X_{j,i}$  each discriminant variable (the previously presented ratios).

#### IV. Sample Analysis

The firm selection was entirely constructed using the information available in *Citius*, an online database managed by the Portuguese Ministry of Justice. Reorganized companies were selected if a reorganization plan was approved by the court between May of 2012 and December 2013, rendering a total of 355 firms. From this gross sample, 11 firms were excluded due to a subsequent and negative revision of the plan's homologation; and an additional 5 observations were dropped due to utter unavailability of the firms' records. Financial data was then collected for the year prior to the approval of the reorganization plan (either the end of 2011 or 2012), using Bureau Van Dijk's SABI database, thus providing insight regarding several accounting

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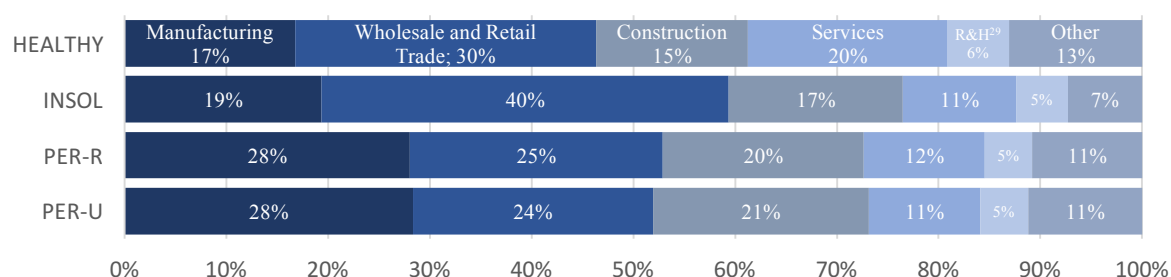
<sup>27</sup> If assuming equal prior probabilities of occurrence for each group.

indicators, namely, total assets, current assets, retained earnings, total equity, total liabilities, current liabilities and earnings before interests and taxes (EBIT). Regarding the outcome of the reorganization, *Citius* was then used to unveil if the companies filed again under *PER* or petitioned for bankruptcy. Finally, though such companies were used for analysing the percentage of recidivist firms, 61 firms were later dropped due to the unavailability of at least one of the mentioned variables.

In order to deepen our understanding of the reorganization phenomenon, a second sample of 315 bankrupted companies was extracted, limited to firms with no record of a previous attempt of restructuring and whose bankruptcy petition was contemporaneous to the restructuring proceedings of the first sample. Finally, 382 healthy firms were selected (firms which are still active and have no record of insolvency proceedings), composing a third sample. In line with the methodology previously used, these samples included the financial indicators described before, for the year 2012.

Descriptive statistics for four samples were computed<sup>28</sup>. In terms of industry distribution and relative to the remaining samples, there is a higher incidence of construction and manufacturing firms in restructuring proceedings.

*Figure 1 – Distribution by Industry*



Regarding the actual status of the companies whose reorganization plan was approved in 2012 or 2013, 141 companies (41.6%) have either entered bankruptcy, attempted a new

<sup>28</sup> Note that the sample denominated by “PER-U” corresponds to the final gross sample of 339 restructured firms, while “PER-R” does not include the 61 firms for which the financial data was incomplete.

<sup>29</sup> Restaurants and Hotels.

reorganization or are inactive. However, adding the number of companies with registered payment incidents, almost half of the reorganizations (48.4%) have failed.

*Table 1 – Current Status of Reorganized Companies*

Status	Plan's Acceptance						Total
	3Q 2012	4Q 2012	1Q 2013	2Q 2013	3Q 2013	4Q 2013	
No record of failure	0	7	25	40	30	73	175
Bankruptcy requested	0	8	23	17	19	23	90
Second reorganization	1	4	14	7	5	10	41
Inactive	0	0	0	4	3	3	10
Payment Incident <sup>30</sup>	0	1	2	6	7	7	23

Moreover, recidivism took, on average, 644 days to materialise and data suggests that an insolvency petition is, in the majority of cases, filed sooner than a second reorganization plan (*Figure 3 – Appendices*). One possible explanation is the lack of flexibility from creditors in the event of default following a reorganization plan, combined with the difficulties arising from a further strike on the debtor's credibility – thus reducing the probability of agreement over the plan, and the attractiveness of the mechanism itself, even for debtors.

Additionally, recurring to the four predictors of the Z''-Score model (Altman and Hotchkiss 2005), it may be suggested that bankrupted companies and restructured ones are not fundamentally different, when analysing financial data from the year prior to bankruptcy or reorganization, respectively, as shown in *Figures 4, 5, 6 and 7* (found in *Appendices*). Regarding  $X_1$  (Net Working Capital/Total Assets) and  $X_2$  (Retained Earnings/Total Assets), similarities within the mentioned samples are rather evident. Additionally, results match the economic intuition, with healthy firms exhibiting a more robust score than distressed firms. Finally, under the hypothesis that data follows a normal distribution according to the Jarque-Bera test, neither variable appears to be normally distributed at a 5% significance level.

<sup>30</sup> Companies with recorded payment incidents (as provided by SABI) over the last 3 years, higher than 5% of the pre-reorganization total liabilities figure and excluding firms included in the previous categories.

Similar results are found in relation to the remaining predictors, namely, the Earnings before Interest and Taxes and Total Assets ratio ( $X_3$  Variable) and the ratio given by Book Value of Equity divided by Total Liabilities ( $X_4$  Variable). Once again economic intuition is in line with the distribution of both variables, though healthy firms exhibit poorer results in terms of EBIT than anticipated (certainly the scars of the debt crisis). Once more, performing the Jarque-Bera test, the distribution of the variables does not exhibit signs of normality, except in the case of variable  $X_4\_PER$  (Figure 7, bottom).

## V. Results

The  $Z''$ -Score model was then recalibrated in order to, firstly, distinguish between healthy and financially distressed<sup>31</sup> Portuguese firms (models A and B). As shown in Table 2, the coefficients obtained using equation (2) are in line with economic intuition, so that a worse ratio score negatively affects the overall model score, thus increasing the probability of default.

Table 2 – Discriminant Function Results: Predicting Financial Distress

Determinant	Expected Sign	Healthy and Insolvent Firms (A)	Healthy and Restructured Firms (B)
$X_1$	Positive	0.395	0.581
$X_2$	Positive	0.635	0.879
$X_3$	Positive	1.286	1.221
$X_4$	Positive	0.033	0.028

Moreover, if we define a maximum Type I error of 25%, i.e., correctly identifying 75% of the distressed companies as so, the first model (A), discriminating between healthy and insolvent firms, was still able to correctly identify 67% of the healthy firms. Regarding the second model (B), the correct-in-sample classification of healthy companies shrank to 63%. Results, in terms of the models' classification power are therefore in line with the Portuguese literature<sup>32</sup>. Wilks' Lambda, as, once again, provided by Resti and Sironi (2007), was also computed for both

<sup>31</sup> Firms that attempted a reorganization or were declared bankrupt in the following year.

<sup>32</sup> For example, Soares (2006).

models, deriving 0.84 and 0.87 for model A and B, respectively<sup>33</sup>. Also, by performing a F-test, both models appear to be statistically significant as a whole (at a 5% significance level).

However, discriminant analysis fails to distinguish between successful reorganizations and recidivists (*Table 3*, model C). Using the same approach, the model yields far less enthusiastic results. Although it is better than mere chance – using the formula provided by Resti and Sironi (2007), thus suggesting a cut-off point of -0.166, the model correctly identifies 67% of successful reorganizations and 42% of failed ones<sup>34</sup> – the low predictive capacity of the model implies little to no usefulness. In addition, no straightforward connection may be drawn regarding the sign and magnitude of the discriminant coefficients, and in fact two out of four conflict with prior expectations. Moreover, with a Wilks' Lambda of 0.97, the model does not appear to be significant at a 5% level (by means of a F-test).

*Table 3 – Discriminant Function Results: Predicting Reorganization Failure*

Determinant	Expected Sign	Failed and Successful Reorganizations (C)	Bankrupted and Restructured Firms (D)
X <sub>1</sub>	Positive	-0.019	-0.226
X <sub>2</sub>	Positive	0.017	0.081
X <sub>3</sub>	Positive	1.002	0.869
X <sub>4</sub>	Positive	-0.370	-0.055

A similar conclusion is made clear when designing a model to differentiate bankrupted from restructured firms (model D). While, in fact, the model as a whole appears to be statistically significant at a 5% level<sup>35</sup>, its Wilks' Lambda – slightly under 0.97 – suggests no better performance than the previously mentioned model. Also, the derived coefficient signs result in a meaningless interpretation, contrary to economic thought. Thus, the model classifies the

<sup>33</sup> Wilks' Lambda is commonly used to test if differences between two given groups' means exist. Thus, smaller values indicate greater discriminatory capability of the model.

<sup>34</sup> Note that the weight of each group was unequal and, more precisely, companies that restructured successfully represented 63% against 37% of companies that later failed.

<sup>35</sup> Though the only relevant variable appears to be X<sub>3</sub>.

majority of firms as non-bankrupted, scoring a hit-rate (i.e., correct classifications) of 73% on the non-bankrupted group but only 43% on the group consisting of bankrupted firms.

Firstly, since the model failed to adequately discriminate between bankrupted and reorganized firms, some natural scepticism arises regarding the filtering capacity of the Portuguese law. Although, it must be noted, Portuguese Law does not rely upon direct accounting measures to determine bankruptcy, it is hardly credible that insolvent firms are no different from firms with only an infrequent inability to comply with financial obligations (as a company eligible for reorganization is defined by *CIRE*, Art 17-B), even in terms of accounting measures.

If two alternatives are presented to a distressed debtor and neither an efficient oversight nor legal sanctions are put in place, the most beneficial option to the debtor will be chosen, even if it conflicts with the law design: law enforcement is far from being guaranteed by mere law enactment. Even if Portuguese Law clearly delineates a duty of the debtor to timely declare bankruptcy (Art 18, *CIRE*), there is virtually no mechanism that prevents non-viable firms from attempting a reorganization and thus delaying bankruptcy. As critically recognized by Menezes Leitão (2012), while the law clearly limits restructuring to viable companies in a state of imminent insolvency (Art 17-A, *CIRE*), it is the debtor who must declare if such requirement is satisfied (Art 17-A, paragraph 2, *CIRE*). Consequently, if no oversight is made by a third party and if no penalty is enforced by the court over non-viable debtors, the self-interest of the latter group will certainly prevail. One possible solution<sup>36</sup>, though conflicting with the debtor-friendly nature of the law, would be to require a declaration from a third party confirming that the company is viable, which should be attached to the initial petition. In fact, this requirement was initially suggested in the draft of *PER* and is common practice in some jurisdictions, namely in the German system.

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<sup>36</sup> A partial solution should be read, since no naivety exists in the following lines.



Secondly, though the study failed to determine if a given company is more likely to succeed or to enter again in a state of financial distress, the model's failure may imply that reorganizations do not fail because it is too late to restructure, since a priori financial data provides none to negligible information regarding the success of a given plan. Thus, companies with a worse financial score are as likely to succeed in restructuring as healthier firms. Robust conclusions are evidently difficult to draw; however, it appears to be the case that either the financial situation of a company has no significant influence in its sustainability or the relation is being distorted and the plan's formulation is dictating the company's sustainability, when the opposite relation should prevail.

Thus, a stricter line could – and should – be drawn in defining if a company is able to reorganize. Reorganization, as defined by the Portuguese Law, should not be mistaken for bankruptcy, since the latter already offers a mechanism to ensure companies are not inevitably liquidated (the so called “bankruptcy with a restructuring plan”, similar to the *Sanierungsplan* of the German counterpart). With no well-defined rule to reject insolvent firms from reorganization, there is growing certainty that the seldom used “bankruptcy with a restructuring plan” is being heavily counterweighed by an indiscriminate use of *PER*. Though it is undeniable that *PER* follows – at least partially – the best practices of other jurisdictions, there is no doubt that a high portion of debtors are inappropriately employing the mechanism.

## **VI. Conclusion**

Deeply inspired by the initial work of Altman (1968) and the later adaptation to the Chapter 22 problem (Altman, Kant, and Rattanuengyot 2009; Altman and Branch 2015), part of the research here conducted aimed at differentiating bankrupted companies from merely distressed ones and, by a similar method and more importantly, viable from non-viable reorganizations. Though these two models failed to winnow companies under such criteria, the results allow nonetheless to establish some conclusions.

Accounting ratios suggest that bankrupted firms are not fundamentally different from reorganized companies, when analysing the year prior to the legalistic event, i.e., bankruptcy or reorganization, respectively. Even if such conclusion may not be entirely surprising, in the sense that insolvency may heavily depend upon other variables, some natural scepticism may arise in regard to the filtering capacity of the Portuguese Law. Consequently, it would be particularly stimulating to analyse the success rate of *SIREVE*, an analogous mechanism to *PER* (though out of court), which requires the approval of *IAPMEI*<sup>37</sup>.

Successful reorganizations do not appear to differ from failed ones either, by accounting analysis. Thus, further research should be made with data from the reorganization plans. In fact, if such information was not added to the present study it was merely due to the immense difficulties that would arise: having access to more than three hundred plans from private firms is unsurprisingly a rather problematic quest. No doubts remain about how insightful this analysis would be in order to assess if indeed some companies are restructuring with the intent of completing a controlled liquidation and if a supermajority per class of creditor should be implemented.

The most important conclusion remains, however, in the Portuguese recidivism rate regarding reorganizations. Over 41% of the reorganizations from 2012 and 2013 have failed, motivating doubts over the efficiency of the mechanism. Thus, evidence suggest that the feasibility standard<sup>38</sup> has been poorly implemented in Portuguese reorganizations.

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<sup>37</sup> An organization that provides financial and technical support to Portuguese firms, especially small and medium companies. Since such organization filters companies using mere accounting information, the mentioned analysis would be particularly interesting in providing a more robust interpretation of this paper findings.

<sup>38</sup> For example, as understood and defined by Chapter 11. While this requirement is only indirectly present in the Portuguese Law, North-American courts require companies to demonstrate that a reorganization plan will not be followed by liquidation or a second reorganization. Thus, debtors must provide evidence supporting that the plan is feasible.

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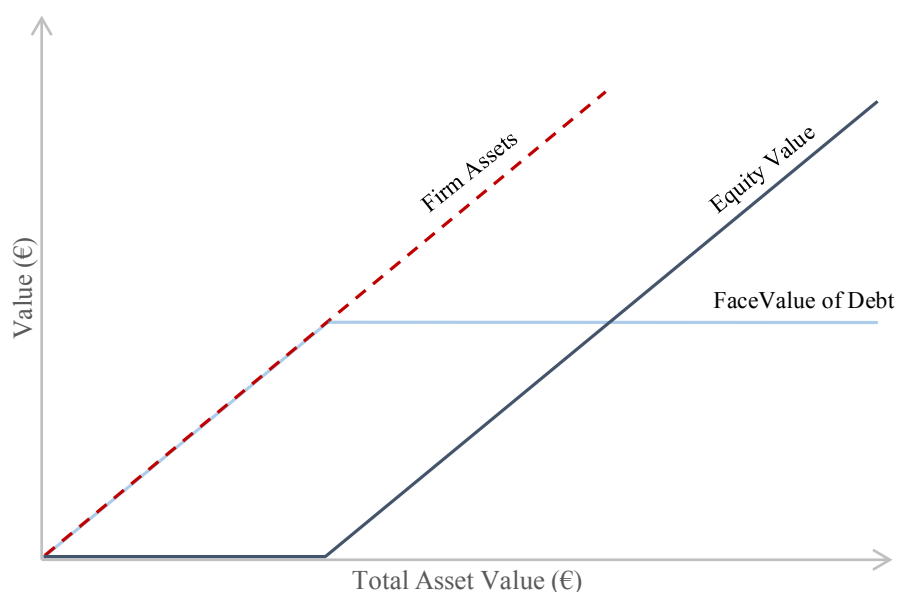
## APPENDICES

Table 4 – Gutiérrez et al (2012) law orientation index

Factor	USA	Spain	Germany ( <i>Insolvenzordnung</i> )	Portugal
<b>Declaration Procedure</b>				
Requirements	0	0.5	1	0
Who can File?	0.5	0	0.5	0
<b>Control of the Firm</b>				
Who decides the first step?	0	0.5	1	0.5
Firm's Management	0	0.25	0.75	0.25
Automatic Stay	0	0.5	0.25	0
DIP Financing	0	0	0	0
<b>Conclusion of the proceeding</b>				
Presentation of the plan	0	0	0.5	0
APR Violations	0	0	1	0
Affects guaranteed creditors	0	1	0	1
Approval of plan	0.5	0	0.5	1
<b>Total</b>	<b>1</b>	<b>2.75</b>	<b>5.5</b>	<b>2.75</b>

- Requirements: 1 – overindebtedness; 0.5 – insolvency required; 0 – no requirement.
- Who can file?: 1 – creditors; 0.5 debtor or creditors; 0 – debtor.
- Who decides at first step?: 1 – creditor or agent; 0.5 – court; 0 – debtor.
- Firm's Management: 1 – external administrator; 0.75 – administrator (preferable) or debtor; 0.5 debtor (preferable) or administrator; 0.25 – debtor (limited decision-making capacity); 0 – debtor.
- Automatic Stay: 1 – no; 0.5 – only non-guaranteed creditors; 0.25 – time limited; 0 – all creditors. DIP financing: 1 – no; 0 – yes.
- Debtor-in-possession Financing: 1 – no; 0 – yes.
- Presentation of the plan: 1 – administrator; 0.5 – debtor or creditors; 0 – debtor priority.
- Absolute Priority Rule Violations: 1 – no; 0 – yes.
- Affects guaranteed creditors: 1 – no; 0 – yes.
- Approval of plan: 1 – creditors; 0.5 – court intervention; 0 – debtor approval required.

Figure 2 – Equity as a Call Option

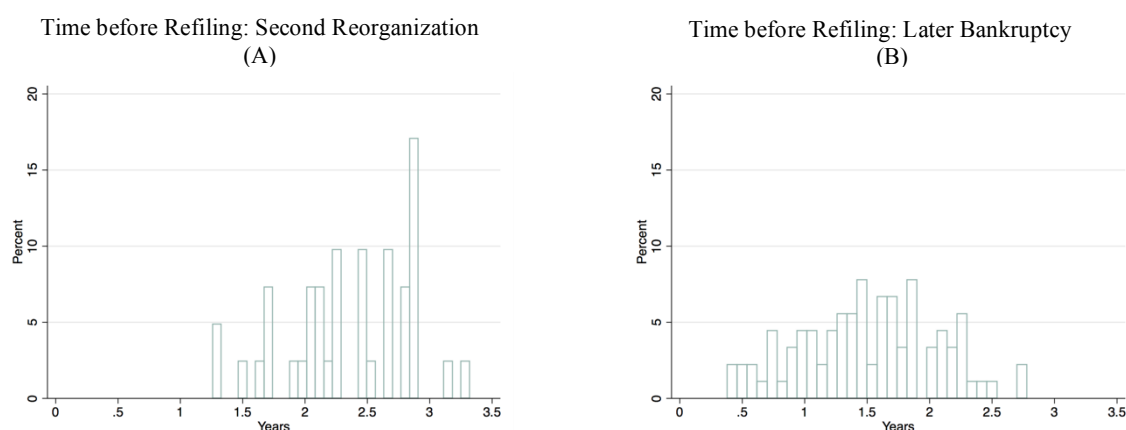


Note: Adapted from Berk and DeMarzo (2013).

As suggested, equity may be seen as a call option held by shareholders on the assets of the firm, whose strike price is given by the face value of debt. Thus if the value of the firm does not exceed the face value of debt, shareholders will not exercise the option and the firm will enter bankruptcy, with creditors taking over the firms' assets; if, however, the value of the firm exceeds the value of debt, the option will be exercised and equity holders will receive the residual claim, i.e., the value of the firm after all debt claims have been paid.

If this reasoning is combined with the Black-Scholes model – the latter implying that the longer the maturity the higher should be the option price – it should be clear how shareholders benefit from a “delay and pray” strategy, i.e., how they benefit by delaying bankruptcy.

Figure 3 – Time to Recidivism<sup>39</sup>

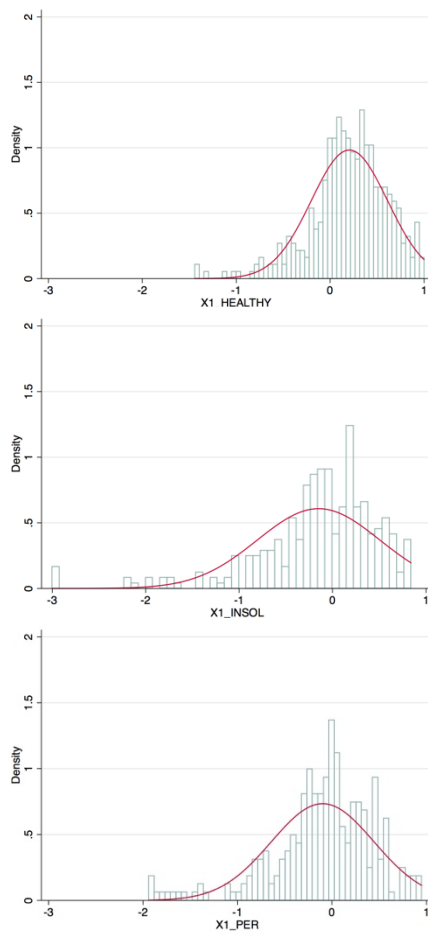


	A	B
Observations	41	90
Mean	2.347	1.501
25 <sup>th</sup> percentile	2.04	2.08
Median	2.43	1.475
75 <sup>th</sup> percentile	2.83	1.86

<sup>39</sup> Time between acceptance of reorganization plan and following petition for reorganization or bankruptcy.

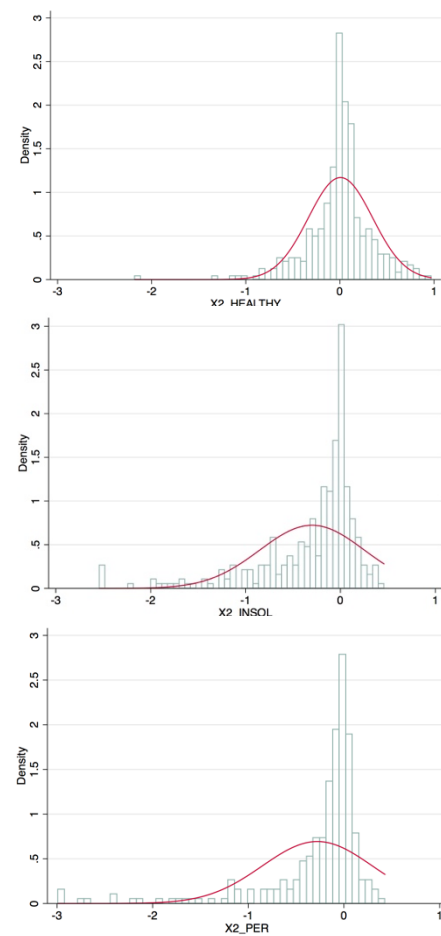


Figure 4 – Distribution of  $X_1$



	Healthy	Insolvent	PER
Observations	382	315	278
Mean	0.205	-0.154	-0.112
25 <sup>th</sup> percentile	0.01	-0.39	-0.31
Median	0.22	-0.06	-0.035
75 <sup>th</sup> percentile	0.48	0.27	0.26
St. Dev.	0.406	0.680	0.618

Figure 5 – Distribution of  $X_2$

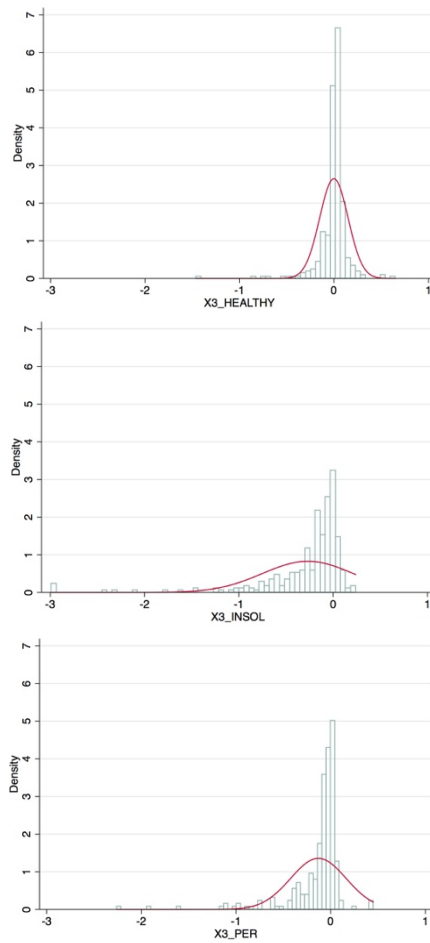


	Healthy	Insolvent	PER
Observations	382	315	278
Mean	0.006	-0.314	-0.291
25 <sup>th</sup> percentile	-0.12	-0.46	-0.32
Median	0.02	-0.1	-0.08
75 <sup>th</sup> percentile	0.14	0.03	0.01
St. Dev.	0.341	0.674	0.655

Note: If required and for graphical purpose only, outliers were presented as assuming the either the 95<sup>th</sup> or the 99<sup>th</sup> percentile.

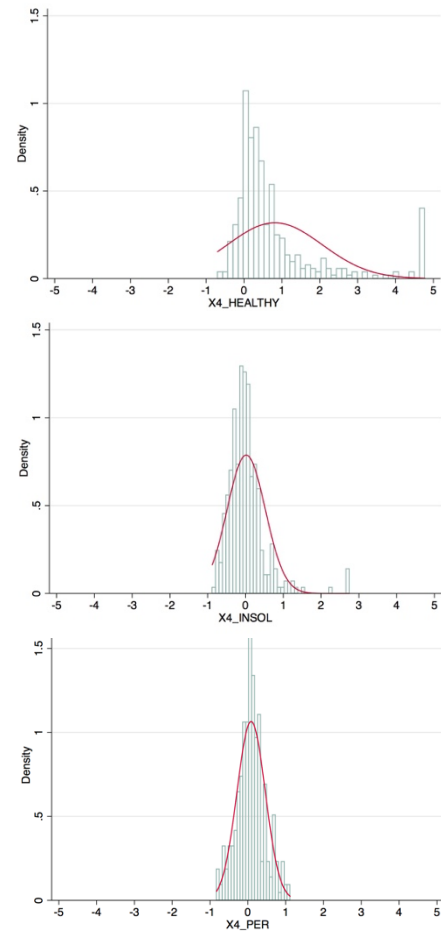
Normal distribution curve for graphical purposes only.

Figure 6 – Distribution of  $X_3$



	Healthy	Insolvent	PER
Observations	382	315	278
Mean	-0.001	-0.279	-0.119
25 <sup>th</sup> percentile	-0.02	-0.35	-0.14
Median	0.02	-0.12	-0.04
75 <sup>th</sup> percentile	0.05	0	0
St. Dev.	0.151	0.551	0.365

Figure 7 – Distribution of  $X_4$



	Healthy	Insolvent	PER
Observations	382	315	278
Mean	1.66	0.079	0.087
25 <sup>th</sup> percentile	0.09	-0.28	-0.13
Median	0.37	-0.04	0.07
75 <sup>th</sup> percentile	0.93	0.19	0.29
St. Dev.	7.210	1.208	0.3747

Note: If required and for graphical purpose only, outliers were presented as assuming the either the 95<sup>th</sup> or the 99<sup>th</sup> percentile.

Normal distribution curve for graphical purposes only.